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PATENT TRADEMARK OFFICE

CHAPTER II

TRANSMITTAL LETTER
TO THE UNITED STATES ELECTED OFFICE (EO/US)

(ENTRY INTO U.S. NATIONAL PHASE UNDER CHAPTER II)

PCT/DK00/00227

4 MAY 2000

17 MAY 1999

17 JUNE 1999

INTERNATIONAL APPLICATION NO. INTERNATIONAL FILING DATE PRIORITY DATE CLAIMED

A METHOD FOR OVERCURRENT PROTECTION IN A SUPERCONDUCTING CABLE

TITLE OF INVENTION

CLAUS NYGAARD RASMUSSEN,
JORGEN NYGARD NIELSEN,
JENS JACOB OSTERGAARD

APPLICANT(S)

Box PCT

Assistant Commissioner for Patents

Washington D.C. 20231

ATTENTION: EO/US

CERTIFICATION UNDER 37 C.F.R. 1.10*

(Express Mail label number is *mandatory*.)(Express Mail certification is *optional*.)

I hereby certify that this correspondence and the documents referred to as attached therein are being deposited with the United States Postal Service on this date November 8, 2001, in an envelope as "Express Mail Post Office to Addressee," Mailing Label Number EV 011019060 US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

BARBARA D. SANTIAGO

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WARNING:

Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

***WARNING:**

Each paper or fee filed by "Express Mail" *must* have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. 1.10(b).

"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will *not* be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

NOTE: *The completion of those filing requirements that can be made at a time later than 30 months from the priority date results from the Commissioner exercising his judgment under the authority granted under 35 USC 371(d). The filing receipt will show the actual date of receipt of the last item completing the entry into the national phase. See 37 C.F.R. §1.491 which states: "An international application enters the national state when the applicant has filed the documents and fees required by 35 USC 371(c) within the periods set forth in § 1.494 and § 1.495."*

WARNING: *Where the items are those which can be submitted to complete the entry of the international application into the national phase are subsequent to 30 months from the priority date the application is still considered to be in the international state and if mailing procedures are utilized to obtain a date the express mail procedure of 37 C.F.R. §1.10 must be used (since international application papers are not covered by an ordinary certificate of mailing - See 37 C.F.R. §1.8.*

NOTE: *Documents and fees must be clearly identified as a submission to enter the national state under 35 USC 371 otherwise the submission will be considered as being made under 35 USC 111. 37 C.F.R. § 1.494(f).*

1. Applicant herewith submits to the United States Elected Office (EO/US) the following items under 35 U.S.C. 371:
 - a. ☒ This express request to immediately begin national examination procedures (35 U.S.C. 371(f)).
 - b. ☒ The U.S. National Fee (35 U.S.C. 371(c)(1)) and other fees (37 C.F.R. § 1.492) as indicated below:

2.Fees

| CLAIMS FEE | (1) FOR | (2) NUMBER FILED | (3) NUMBER EXTRA | (4) RATE | (5) CALCULATIONS | |
|--------------|--|------------------|------------------|--------------|------------------|------------|
| []* | TOTAL CLAIMS | 16- 20 = | | x \$ 18.00 = | \$ | |
| | INDEPENDENT CLAIMS | 2- 3 = | | x \$ 84.00 = | | |
| | MULTIPLE DEPENDENT CLAIM(S) (if applicable) + \$280.00 | | | | | |
| BASIC FEE** | <p>[] U.S. PTO WAS INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where an International preliminary examination fee as set forth in § 1.482 has been paid on the international application to the U.S. PTO:</p> <p>[] and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness) and industrial activity, as defined in PCT Article 33(2) to (4) have been satisfied for all the claims presented in the application entering the national stage (37 CFR 1.492(a)(4)) \$100.00</p> <p>[] and the above requirements are not met (37 CFR 1.492(a)(1)) \$710.00</p> <p>[] U.S. PTO WAS NOT INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where no international preliminary examination fee as set forth in § 1.482 has been paid to the U.S. PTO, and payment of an international search fee as set forth in § 1.445(a)(2) to the U.S. PTO:</p> <p>[] has been paid (37 CFR 1.492(a)(2)) \$740.00</p> <p>[] has not been paid (37 CFR 1.492(a)(3)) \$1,040.00</p> <p>[X] where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 CFR 1.492(a)(5)) \$890.00</p> | | | | | |
| | Total of above Calculations | | | | | = \$890.00 |
| SMALL ENTITY | Reduction by ½ for filing by small entity, if applicable. Statement may also be filed. (note 37 CFR 1.9, 1.27, 1.28) | | | | | - |
| | Subtotal | | | | | \$890.00 |
| | Total National Fee | | | | | \$890.00 |
| | Fee for recording the enclosed assignment document \$40.00 (37 CFR 1.21(h)). (See Item 13 below). See attached "ASSIGNMENT COVER SHEET". | | | | | |
| TOTAL | Total Fees enclosed | | | | | \$890.00 |

*See attached Preliminary Amendment Reducing the Number of Claims.

- i. ☒ A check in the amount of \$890.00 to cover the above fees is enclosed.
 ii. ☐ Please charge Account No. _____ in the amount of \$ _____.
 A duplicate copy of this sheet is enclosed.

****WARNING:** "To avoid abandonment of the application the applicant shall furnish to the United States Patent and Trademark Office not later than the expiration of 30 months from the priority date: * * * (2) the basic national fee (see § 1.492(a)). The 30-month time limit may not be extended." 37 C.F.R. § 1.495(b).

WARNING: If the translation of the international application and/or the oath or declaration have not been submitted by the applicant within thirty (30) months from the priority date, such requirements may be met within a time period set by the Office. 37 C.F.R. § 1.495(b)(2). The payment of the surcharge set forth in § 1.492(e) is required as a condition for accepting the oath or declaration later than thirty (30) months after the priority date. The payment of the processing fee set forth in § 1.492(f) is required for acceptance of an English translation later than thirty (30) months after the priority date. Failure to comply with these requirements will result in abandonment of the application. The provisions of § 1.136 apply to the period which is set. Notice of Jan. 3, 1993, 1147 O.G. 29 to 40.

3. ☒ A copy of the International application as filed (35 U.S.C. 371(c)(2)):

NOTE: Section 1.495 (b) was amended to require that the basic national fee and a copy of the international application must be filed with the Office by 30 months from the priority date to avoid abandonment "The International Bureau normally provides the copy of the international application to the Office in accordance with PCT Article 20. At the same time, the International Bureau notifies applicant of the communication to the Office. In accordance with PCT Rule 47.1, that notice shall be accepted by all designated offices as conclusive evidence that the communication has duly taken place. Thus, if the applicant desires to enter the national stage, the applicant normally need only check to be sure the notice from the International Bureau has been received and then pay the basic national fee by 30 months from the priority date." Notice of Jan. 7, 1993, 1147 O.G. 29 to 40, at 35-36. See item 14c below.

- a. ☐ is transmitted herewith.
 b. ☐ is not required, as the application was filed with the United States Receiving Office.
 c. ☒ has been transmitted
 i. ☒ by the International Bureau.
 Date of mailing of the application (from form PCT/IB/308): _____.
 ii. ☐ by applicant on _____.
 Date

4. ☒ A translation of the International application into the English language (35 U.S.C. 371(c)(2)):
 a. ☒ is transmitted herewith.
 b. ☐ is not required as the application was filed in English.
 c. ☐ was previously transmitted by applicant on _____.
 Date
 d. ☐ will follow.

- (Transmittal Letter to the United States Elected Office (EO/US)—page 5 of 8) 13-18

10. ☒ An oath or declaration of the inventor (35 U.S.C. 371(c)(4)) complying with 35 U.S.C. 115
- a. ☐ was previously submitted by applicant on _____.
Date
- b. ☐ is submitted herewith, and such oath or declaration
- i. ☐ is attached to the application.
- ii. ☐ identifies the application and any amendments under PCT Article 19 that were transmitted as stated in points 3(b) or 3(c) and 5(b); and states that they were reviewed by the inventor as required by 37 C.F.R. 1.70.
- c. ☒ will follow.

Other document(s) or information included:

11. ☒ An International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a):
- a. ☒ is transmitted herewith.
- b. ☐ has been transmitted by the International Bureau.
Date of mailing (from form PCT/IB/308): _____.
- c. ☐ is not required, as the application was searched by the United States International Searching Authority.
- d. ☐ will be transmitted promptly upon request.
- e. ☐ has been submitted by applicant on _____.
Date
12. ☒ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98:
- a. ☐ is transmitted herewith.
Also transmitted herewith is/are:
☐ Form PTO-1449 (PTO/SB/08A and 08B).
☐ Copies of citations listed.
- b. ☒ will be transmitted within THREE MONTHS of the date of submission of requirements under 35 U.S.C. 371(c).
- c. ☐ was previously submitted by applicant on _____.
Date
13. ☐ An assignment document is transmitted herewith for recording.

A separate ☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

14. ☒ Additional documents:
- a. ☒ Copy of request (PCT/RO/101)
 - b. ☒ International Publication No. WO 00/70631
 - i. ☒ Specification, claims and drawing
 - ii. ☐ Front page only
 - c. ☒ Preliminary amendment (37 C.F.R. § 1.121)
 - d. ☒ Other

FORM PTO/ISA/220, FORM PCT/IPEA/416,

15. ☒ The above checked items are being transmitted
- a. ☒ before 30 months from any claimed priority date.
 - b. ☐ after 30 months.

16. ☐ Certain requirements under 35 U.S.C. 371 were previously submitted by the applicant on _____, namely:
- _____
- _____
- _____

AUTHORIZATION TO CHARGE ADDITIONAL FEES

WARNING: *Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges if extra claims are authorized.*

NOTE: *"A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).*

NOTE: *"Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).*

☒ The Commissioner is hereby authorized to charge the following additional fees that may be required by this paper and during the entire pendency of this application to Account No. 12-0425.

☒ 37 C.F.R. 1.492(a)(1), (2), (3), and (4) (filing fees)

WARNING: *Because failure to pay the national fee within 30 months without extension (37 C.F.R. § 1.495(b)(2)) results in abandonment of the application, it would be best to always check the above box.*

☐ 37 C.F.R. 1.492(b), (c) and (d) (presentation of extra claims)

NOTE: *Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must*

only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.492(d)), it might be best not to authorize the PTO to charge additional claim fees, except possible when dealing with amendments after final action.

- ☒ 37 C.F.R. 1.17 (application processing fees)
☒ 37 C.F.R. 1.17(a)(1)-(5)(extension fees pursuant to § 1.136(a).
☒ 37 C.F.R. 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b).

NOTE: 37 C.F.R. 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying . . . issue fee." From the wording of 37 C.F.R. § 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

- ☐ 37 C.F.R. § 1.492(e) and (f) (surcharge fees for filing the declaration and/or filing an English translation of an International Application later than 30 months after the priority date).


 SIGNATURE OF PRACTITIONER

WILLIAM R. EVANS

(type or print name of practitioner)

 P.O. Address

 c/o Ladas & Parry
 26 West 61st Street
 New York, N.Y. 10023

Reg. No.: 25,858

Tel. No.: (212) 708-1930

Customer No.: 00140

10009227-032002

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: CLAUS NYGAARD RASMUSSEN, ET AL

International Application No.: PCT/DK00/00227

International Filing Date: 4 MAY 2000

Priority Date: 17 MAY 1999 & 17 JUNE 1999

For: A METHOD FOR OVER CURRENT PROTECTION IN A SUPERCONDUCTING
CABLE

Attorney Docket No.: U 013710-8

Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

PRELIMINARY AMENDMENT

Please amend the above identified application as follows:

IN THE CLAIMS:

Please cancel Claims 1-14.

Add the following new claims:

CERTIFICATE UNDER 37 CFR 1.10

I hereby certify that this paper is being deposited with the United States Postal Service on this date NOVEMBER 8, 2001 in an envelope as "EXPRESS MAIL POST OFFICE TO ADDRESSEE" Mailing Label Number EV 011019060 US addressed to the: Commissioner of Patents and Trademarks, Washington, D.C. 20231

BARBARA D. SANTIAGO

(Type or print name of person mailing paper)

Barbara D. Santiago

(Signature of person mailing paper)

NOTE: Each paper or fee referred to as enclosed herein has the number of the "EXPRESS MAIL" mailing label place thereon prior to mailing 37 CFR 1.16(b).

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15. A method for overcurrent protection in a superconducting cable comprising a current detector, which is inserted in series with cable conductors of the superconducting cable, wherein an electrical conductor is integrated in the cable construction during cable manufacturing and said electrical conductor is electrically connected in parallel with both the cable conductors of the superconducting cable and the current detector, and said electrical conductor has a higher impedance than the superconducting cable when said cable is in its superconducting state.

16. A method according to claim 15, wherein at least part of said electrical conductor is placed outside the cryostat of the superconducting cable.

17. A method according to claim 15, wherein said electrical conductor is placed outside the cryostat of the superconducting cable.

18. A method according to claim 15, wherein said electrical conductor is placed inside the cryostat of the superconducting cable.

19. A method according to claim 15, wherein at least one superconducting piece is inserted as the current detector.

20. A method according to claim 15, wherein the current detector comprises a superconducting material which quenches at a lower current than the superconducting cable.

21. A method according to claim 15, wherein the current detector comprises a

circuit breaker, e.g. a fuse, a thyristor, a transistor, or similar power electronic components.

22. A method according to claim 15, wherein the current detector is constituted by a current-dependent resistance.

23. A method according to claim 15, wherein a cold shunt is inserted in parallel with the cable conductors of the superconducting cable

24. A superconducting cable wherein the cable conductors of the cable are connected in series with a current detector for overcurrent detection, and it comprises an electrical conductor electrically connected in parallel with both the cable conductors of the superconducting cable and the current detector, and said electrical conductor has a higher impedance than the superconducting cable when said cable is in its superconducting state.

25. A superconducting cable according to claim 24, wherein at least part of said electrical conductor is placed outside the cryostat of the superconducting cable.

26. A superconducting cable according to claim 24, wherein said electrical conductor is placed outside the cryostat of the superconducting cable.

27. A superconducting cable according to claim 24, wherein said electrical conductor is placed inside the cryostat of the superconducting cable.

28. A superconducting cable according to claim 24, wherein the part of said

electrical conductor placed inside the superconducting cable and performing the function of a cold shunt, is wound in such a way that the current in this is reduced to a minimum during normal operation.

29. A superconducting cable according to claim 24, wherein the current detector comprises a circuit breaker or a current limiter, and that the circuit breaker comprises a fuse and/or high-speed power electronics.

30. A superconducting cable according to claim 24, wherein the current detector is constituted by a superconducting material such as YBCO or Bi 2212.

REMARKS

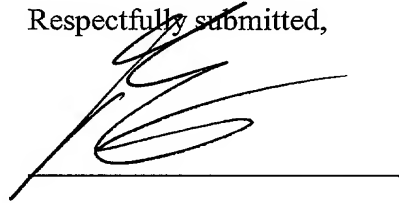
The advantages of the invention as formulated in amended Claim 15 (and the corresponding apparatus Claim 24)) over the prior art are the following:

- The invention integrates a shunt in the cable (it is not a coupling of discrete components).
- In case of an over-current situation, the electrical conductor diverts a substantial part of the current from the superconducting cable and the current detector (it does not break the current or limit the over-current substantially), which has the advantages of
 - resulting in a reduced switch-on time
 - enabling a simpler current detector construction, because of lower potential differences over the component
 - thus improving performance and reducing costs.

We have amended independent method and product claims (Claims 1 and 10, respectively) to stress that the electrical conductor inserted in parallel with the cable conductors should not carry the current when the cable conductors are in a superconducting state (cf. original Claim 5).

We have made independent claims that exemplify that the electrical conductor may be placed fully or partially inside or outside the cryostat.

Respectfully submitted,

A handwritten signature in black ink, appearing to be 'W. R. Evans', written over a horizontal line.

WILLIAM R. EVANS
LADAS & PARRY
26 WEST 61ST STREET
NEW YORK, NEW YORK 10023
REG.NO.25858(212)708-1930

Amended description and Claims

PCT/DK00/00227

A method for overcurrent protection in a superconducting cable.

- 5 The invention relates to a method for overcurrent protection in a superconducting cable, comprising a current detector, which is inserted in series with the cable conductor of the superconducting cable

Furthermore, the invention relates to a superconducting cable, wherein the cable
10 conductors of the cable are connected in series with a current detector for overcurrent detection.

When using superconducting cables in a high-voltage system, it is important that said cables are protected from overcurrents since the result of overcurrents in the
15 cable conductor of a superconducting cable is loss of superconductivity thereof.

This means that the cable could soon be exposed to destruction, since the superconducting tapes conducting the current are not at all adapted to transmit large currents, when they are not superconducting.

- 20 A typical requirement for a superconducting cable is that it should be protected from overcurrents.

This protection requirement may e.g. be that the cable should be able to withstand approximately 40 kA for 1 second.

- 25 JP 01 039230 discloses a method for protecting a superconducting cable against overcurrent by inserting a current detector in series with the cable conductor.

The object of the invention is now to provide a method for protecting a superconducting cable, accommodating the requirements stipulated above.

30

The objective of the invention is fulfilled by a method of the type defined in the preamble of claim 1, the method being characterized in that an electrical conductor is inserted in parallel with the cable conductors of the superconducting cable and the current detector.

35

Hence, constant monitoring of the current in the superconducting cable during operation is ensured, so that if the current exceeds some predetermined limits, the current will be broken or limited prior to a destructive, heavy heating of the cable.

Thus, when the superconducting state ceases, the current is allowed to be diverted
5 in the hot shunt.

As indicated in claim 4, that the current detector constitutes at least one superconducting piece, reliable overcurrent detection is obtained, since the superconducting pieces - if exposed to a current that is too high - exit their
10 superconducting state, causing an intense generation of heat in the superconducting pieces.

This generation of heat can then be used if, as inter alia indicated in claim 6, a fuse is inserted as a circuit breaker to break the current to the cable conductors of the
15 superconducting cable.

With a view to accommodating the time delay in a circuit breaker, specifically the inevitable time delay defined by the period of time necessary for breaking a current by means of a circuit breaker, it is advantageous, as indicated in claim 8, to a cold
20 shunt is inserted in parallel with the cable conductors of the superconducting cable. The cold could be designed to be capable of carrying e.g. 40kA in 0.1 second.

It is noted that the for diversion of the current to the superconducting cable after the above-mentioned 0.1 second has elapsed, then the electrical conductor is
25 preferably inserted.

Additional appropriate embodiments of the method are set out in claims 2,3,5 and 7.

30 As already mentioned, the invention also relates to a superconducting cable wherein the cable conductors of the cable are connected in series with a current detector for overcurrent detection

This cable is of the type defined in the preamble of claim 9 and is characterised in that an electrical conductor is inserted in parallel with the cable conductors of the superconducting cable and the current detector.

5 Appropriate embodiments of the cable are set out in the independent claims 10-14.

In the following, the invention will be discussed in greater detail with reference to an exemplary embodiment shown in the drawings in which:

10 Fig. 1 shows a basic construction of a superconducting cable with overcurrent protection according to the invention,

Fig. 2 shows a more detailed construction of an embodiment of the cable with overcurrent protection according to the invention,

15

Fig. 3 shows the relationship with respect to time between currents flowing in the cable according to Fig. 2 in an overcurrent situation, whereas

Fig. 4 shows in perspective and partially intersected a superconducting cable with
20 overcurrent protection according to the invention.

In Fig. 1 a superconducting cable is denoted by 1, said superconducting cable possibly, as known in the art, being constructed of a core, around which one or more layers of superconducting tapes is/are wound.

25

Current detectors 3, 4 are coupled to the ends of the cable, the current detectors having built-in circuit breakers or current limiters.

The current detectors may e.g. comprise superconducting pieces such as YBCO or Bi 2212 with built-in circuit breakers, and may be dimensioned such that they
30 quench at a lower current than the superconductor of the actual cable, implying that if the current in the superconducting pieces exceeds a certain value, then the current to the superconducting cable will be broken after a short period of time.

By use of current limiters, the current will naturally be limited.

A hot shunt is coupled in parallel with a series connection of the superconducting
35 pieces and the cable conductors of the superconducting cable, said shunt being ca-

pable of diverting the current supplied for a short period of time if the current detectors break the current or the current limiter limits the current.

Fig. 2 shows a more detailed embodiment of the superconducting cable according to the invention.

In this figure, 3,4 again denotes current and the reference number 7 denotes a superconducting cable.

A cold shunt is provided in parallel with the cable conductors of the cable, the shunt being denoted by the reference number 11. This shunt is cooled to the temperature of the superconductor. On the outside of this cold shunt is a cryostat 8, and on the outside thereof is an electrical insulation 9.

On the inside of the electrical insulation 9, an electrical conductor 10 is provided, which is made e.g. of copper and serves as a hot shunt at ambient temperature, cf. below.

15

The operation of the current detector in the superconducting cable will now be explained in greater detail with reference to the current plot of Fig. 3.

If it is ascertained that a current, which is too high, is flowing in the superconducting pieces 3, 4 the current will in a short time period flow in the cold shunt 11.

Then the current will be fed to the hot shunt 10, wherein the current will increase steeply as indicated by the broken line in Fig. 3 at the time 0.1s. At the same time, the current in the cold shunt 11 will decrease steeply.

25

Damage to the superconducting cable in the event that its superconductivity ceases can thus be avoided, which means that it becomes ohmic and consequently not capable of conducting the usual currents that can be conducted in the superconducting state.

30

Fig. 4 shows in perspective and partially intersected a superconducting cable as occurring in actual practice, which can be used in connection with the current protection as explained in connection with the preceding figures.

In this figure, 12 denotes a shield on the outside of which is a jacket 14. Inside the jacket is a dielectric insulator 15 surrounding an outer steel tube 16.

Inside the steel tube 16, spacers 17 are arranged that are supported by an aluminium foil 18 abutting an inner steel tube 19.

- 5 Inside the inner steel tube 19 a number of superconducting tapes 1 are wound around a hollow core 21.

The cooling of the superconducting tapes can be effected by supplying refrigerant to the channel 22 of the hollow core.

- 10 The reference number 11 denotes the position in which the cold shunt can be placed as explained above, whereas the reference number 24 denotes the position within the dielectric insulator, where the hot shunt can be placed.

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Claims:

PCT/DK00/00227

- 5 1. A method for overcurrent protection in a superconducting cable, comprising a current detector (3,4), which is inserted in series with the cable conductor of the superconducting cable, characterized in that an electrical conductor (10) is inserted in parallel with the cable conductors of the superconducting cable (1) and the current detector (3,4).
- 10 2. A method according to claim 1 characterized in that the electrical conductor (10) has a higher impedance than the superconducting cable (1) when in its superconducting state.
- 15 3. A method according to claim 1 - 2, characterized in that the electrical conductor (10) is placed outside a cryostat (8) of the superconducting cable (1).
4. A method according to claim 1 - 3, characterized in that the current detector (3,4) constitutes at least one superconducting piece.
- 20 5. A method according to any of claims 1 - 4, characterized in that the current detector (3,4) comprises a superconducting material which quenches at a lower current than the superconducting cable (7).
- 25 6. A method according to any of claims 1-5, characterized in that the current detector (3,4) comprises a relay or a circuit breaker e.g. fuse, a thyristor, a transistor, or similar power electronic components.
7. A method according to any of claims 1-6, characterized in that the current detector (3,4) is constituted by a current-dependent resistance.
- 30 8. A method according to any of claims 1 - 7, characterized in that a cold shunt (11) is inserted in parallel with the cable conductors of the superconducting cable (7).
- 35

5 9. A superconducting cable (1) wherein the cable conductors of the cable are connected in series with a current detector (3,4) for overcurrent detection, characterized in that an electrical conductor (10) is inserted in parallel with the cable conductors of the superconducting cable (1) and the current detector (3,4).

10 10. A superconducting cable according to claim 9, characterized in that the electrical conductor (10) has a higher impedance than the superconducting cable (1) when in its superconducting state.

11. A superconducting cable according to claim 9 or 10, characterized in that the electrical conductor (10) is placed outside a cryostat (8) of the superconducting cable.

15 12. A superconducting cable according to claim 11 characterized in that the cold shunt (8) is wound in such a way that the current in this is reduced to a minimum during normal operation.

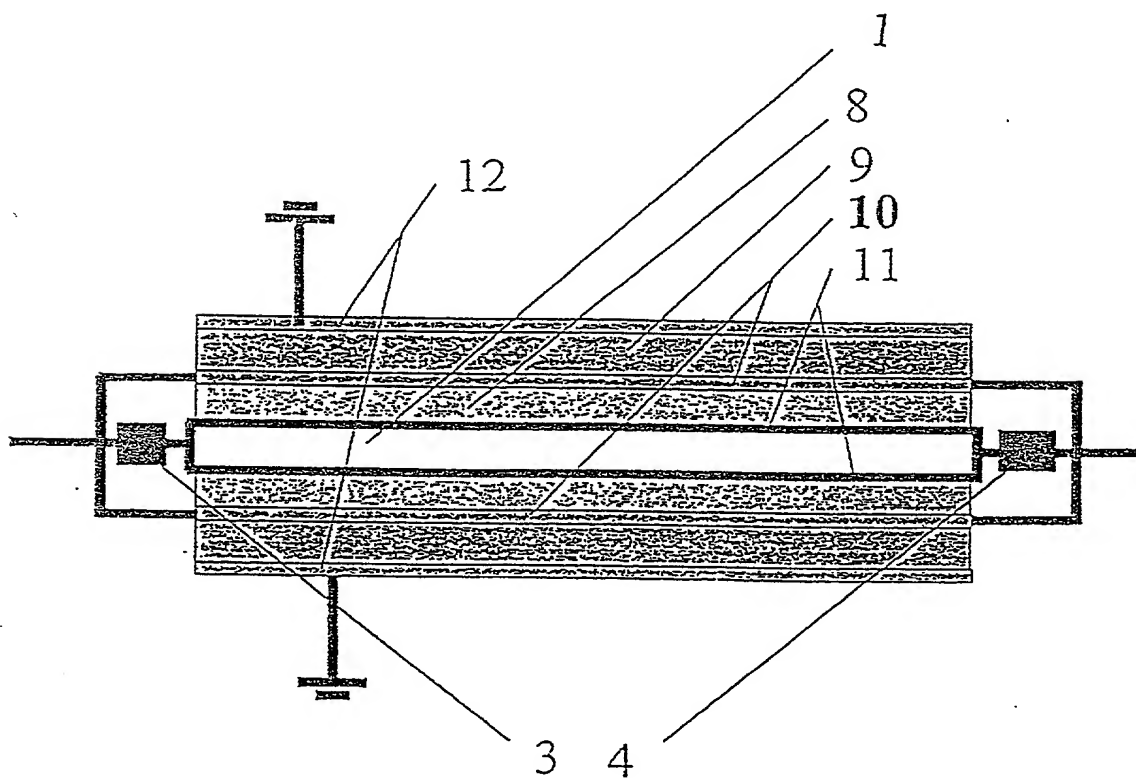
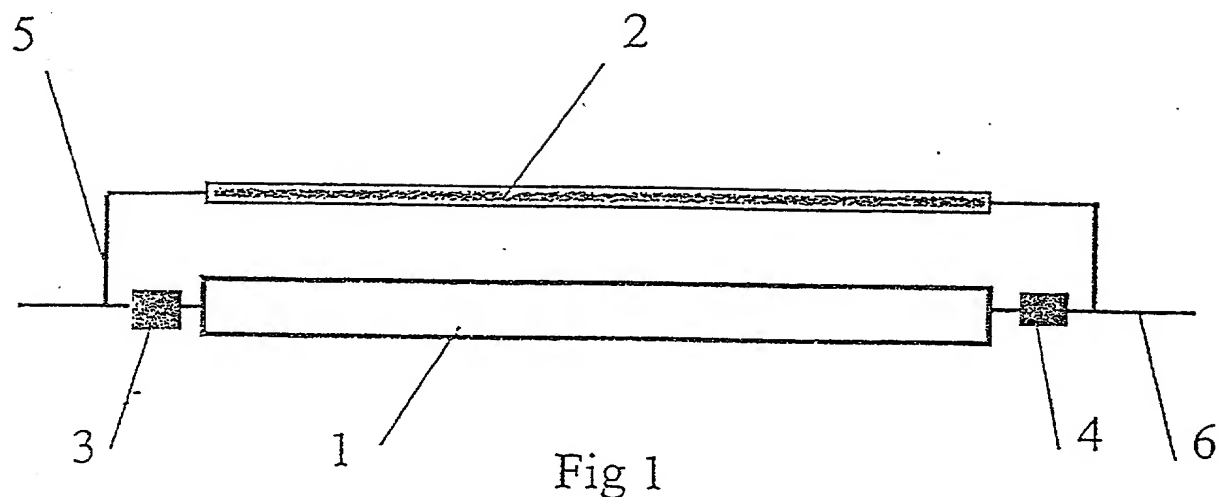
20 13. A superconducting cable according to claim 9 - 12, characterized in that the current detector (3,4) comprises a circuit breaker or a current limiter, and that the circuit breaker comprises a fuse and/or high-speed power electronics.

25 14. A superconducting cable according to claim 9 - 13, characterized in that the current detector is constituted by a superconducting material such as YBCO or Bi 2212.

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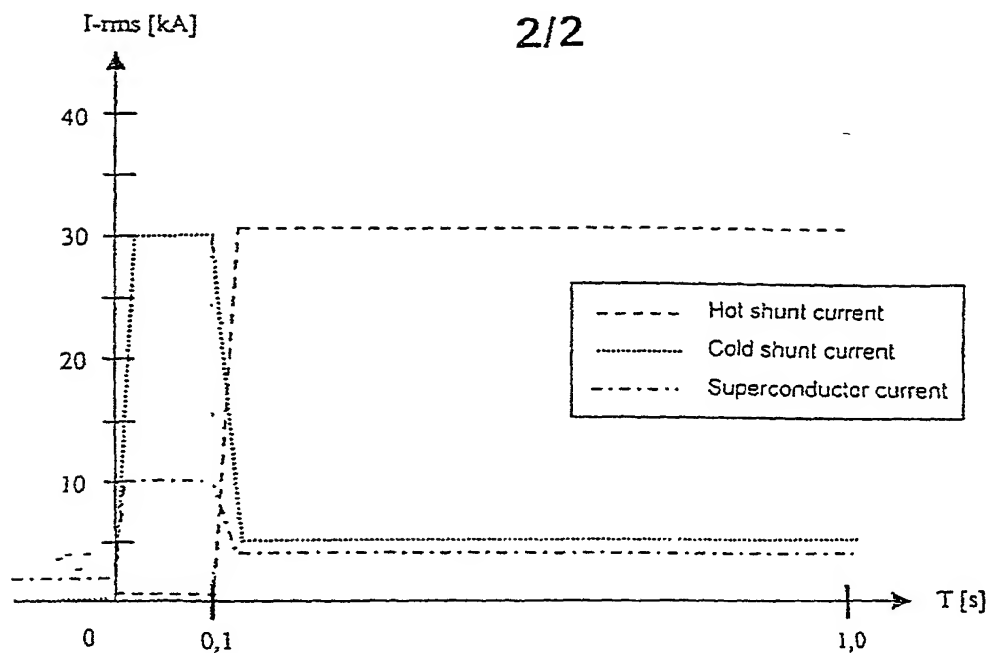


Fig 3

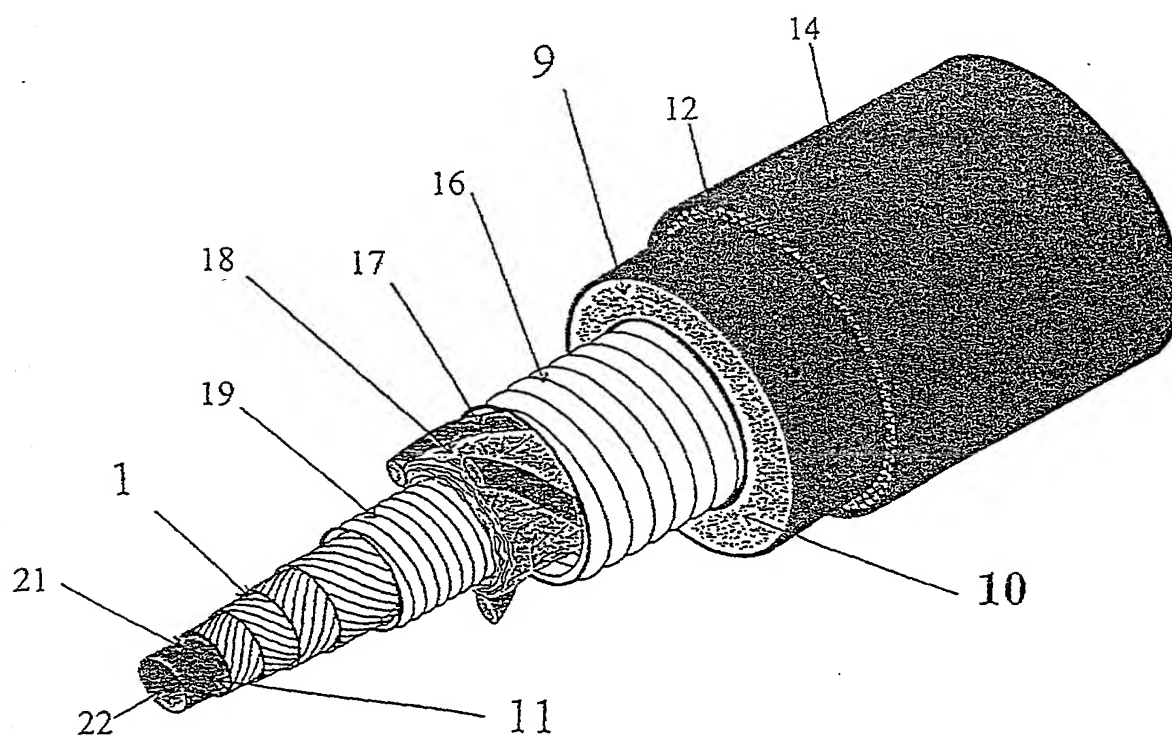


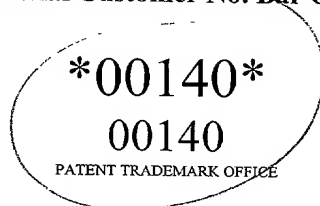
Fig 4

#5

Practitioner's Docket No. U 013710-8

PATENT

Optional Customer No. Bar Code



COMBINED DECLARATION AND POWER OF ATTORNEY

(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL, DIVISIONAL,
CONTINUATION, OR C-I-P)

As a below named inventor, I hereby declare that:

TYPE OF DECLARATION

This declaration is of the following type:

(check one applicable item below)

- ☐ original.
☐ design.

NOTE: With the exception of a supplemental oath or declaration submitted in a reissue, a supplemental oath or declaration is not treated as an amendment under 37 CFR 1.312 (Amendments after allowance). M.P.E.P. Section 714.16, 7th Ed.

- ☐ supplemental.

NOTE: If the declaration is for an International Application being filed as a divisional, continuation or continuation-in-part application, do not check next item; check appropriate one of last three items.

- ☒ national stage of PCT.

NOTE: If one of the following 3 items apply, then complete and also attach ADDED PAGES FOR DIVISIONAL, CONTINUATION OR C-I-P.

NOTE: See 37 C.F.R. Section 1.63(d) (continued prosecution application) for use of a prior nonprovisional application declaration in the continuation or divisional application being filed on behalf of the same or fewer of the inventors named in the prior application.

- ☐ divisional.
☐ continuation.

NOTE: Where an application discloses and claims subject matter not disclosed in the prior application, or a continuation or divisional application names an inventor not named in the prior application, a continuation-in-part application must be filed under 37 C.F.R. Section 1.53(b) (application filing requirements-nonprovisional application).

- ☐ continuation-in-part (C-I-P).

INVENTORSHIP IDENTIFICATION

WARNING: *If the inventors are each not the inventors of all the claims, an explanation of the facts, including the ownership of all the claims at the time the last claimed invention was made, should be submitted*

My residence, post office address and citizenship are as stated below, next to my name. I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter that is claimed, and for which a patent is sought on the invention entitled:

TITLE OF INVENTION

A METHOD FOR OVERCURRENT PROTECTION IN A SUPERCONDUCTING CABLE

SPECIFICATION IDENTIFICATION

The specification of which:

(complete (a), (b), or (c))

(a) ☐ is attached hereto.

NOTE: *"The following combinations of information supplied in an oath or declaration filed on the application filing date with a specification are acceptable as minimums for identifying a specification and compliance with any one of the items below will be accepted as complying with the identification requirement of 37 C.F.R. Section 1.63:*

"(1) name of inventor(s), and reference to an attached specification which is both attached to the oath or declaration at the time of execution and submitted with the oath or declaration on filing;

"(2) name of inventor(s), and attorney docket number which was on the specification as filed; or

"(3) name of inventor(s), and title which was on the specification as filed."

Notice of July 13, 1995 (1177 O.G. 60).

(b) ☐ was filed on _____, ☐ as Application No. _____
☐ and was amended on _____ (if applicable).

NOTE: *Amendments filed after the original papers are deposited with the PTO that contain new matter are not accorded a filing date by being referred to in the declaration. Accordingly, the amendments involved are those filed with the application papers or, in the case of a supplemental declaration, are those amendments claiming matter not encompassed in the original statement of invention or claims. See 37 C.F.R. Section 1.67.*

NOTE: *"The following combinations of information supplied in an oath or declaration filed after the filing date are acceptable as minimums for identifying a specification and compliance with any one of the items below will be accepted as complying with the identification requirement of 37 C.F.R. Section 1.63:*

- (A) application number (consisting of the series code and the serial number, e.g., 08/123,456),
- (B) serial number and filing date,
- (C) attorney docket number which was on the specification as filed;
- (D) title which was on the specification as filed and reference to an attached specification which is both attached to the oath or declaration at the time of execution and submitted with the oath or declaration; or
- (E) title which was on the specification as filed and accompanied by a cover letter accurately identifying the application for which it was intended by either the application number (consisting of the series code and the serial number, e.g., 08/123,456), or serial number and filing date. Absent any statement(s) to the contrary, it will be presumed that the application filed in the PTO is the application which the inventor(s) executed by signing the oath or declaration.

M.P.E.P. Section 601.01(a), 7th ed.

- (c) ☒ was described and claimed in PCT International Application No. DK00/00227 filed on 4 MAY 2000 and as amended under PCT Article 19 on _____ (any).

SUPPLEMENTAL DECLARATION (37 C.F.R. Section 1.67(b))

(complete the following where a supplemental declaration is being submitted)

☐ I hereby declare that the subject matter of the

☐ attached amendment

☐ amendment filed on _____

was part of my/our invention and was invented before the filing date of the original application, above identified, for such invention.

ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information, which is material to patentability as defined in 37, Code of Federal Regulations, Section 1.56,

(also check the following items, if desired)

☐ and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable Examiner would consider it important in deciding whether to allow the application to issue as a patent, and

☐ in compliance with this duty, there is attached an information disclosure statement, in accordance with 37 C.F.R. Section 1.98.

PRIORITY CLAIM (35 U.S.C. Section 119(a)-(d))

NOTE: "The claim to priority need be in no special form and may be made by the attorney or agent if the foreign application is referred to in the oath or declaration as required by Section 1.63. The claim for priority and the certified copy of the foreign application specified in 35 U.S.C. Section 119(b) must be filed in the case of an interference (Section 1.630), when necessary to overcome the date of a reference relied upon by the examiner, when specifically required by the examiner, and in all other situations, before the patent is granted. If the claim for priority or the certified copy of the foreign application is filed after the date the issue fee is paid, it must be accompanied by a petition requesting entry and by the fee set forth in Section 1.17(i). If the certified copy is not in the English language, a translation need not be filed except in the case of interference; or when necessary to overcome the date of a reference relied upon by the examiner; or when specifically required by the examiner, in which event an English language translation must be filed together with a statement that the translation of the certified copy is accurate." 37 C.F.R. Section 1.55(a).

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of

America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

(complete (d) or (e))

- (d) ☐ no such applications have been filed.
(e) ☒ such applications have been filed as follows.

NOTE: Where item (e) is entered above and the International Application which designated the U.S. itself claimed priority check item (e), enter the details below and make the priority claim.

**PRIOR FOREIGN/PCT APPLICATION(S) FILED WITHIN 12 MONTHS
(6 MONTHS FOR DESIGN) PRIOR TO THIS APPLICATION
AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. SECTION 119(a)-(d)**

| COUNTRY (OR INDICATE IF PCT) | APPLICATION NUMBER | DATE OF FILING day, month, year | PRIORITY CLAIMED UNDER 35 USC 119 |
|------------------------------------|--------------------|------------------------------------|---|
| DK | PA 1999 00685 | 17 MAY 1999 | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO |
| DK | PA 1999 00864 | 17 JUNE 1999 | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO |
| | | | <input type="checkbox"/> YES <input type="checkbox"/> NO |
| | | | <input type="checkbox"/> YES <input type="checkbox"/> NO |
| | | | <input type="checkbox"/> YES <input type="checkbox"/> NO |

**CLAIM FOR BENEFIT OF PRIOR U.S. PROVISIONAL APPLICATION(S)
(35 U.S.C. Section 119(e))**

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below:

PROVISIONAL APPLICATION NUMBER

FILING DATE

**CLAIM FOR BENEFIT OF EARLIER U.S./PCT APPLICATION(S)
UNDER 35 U.S.C. SECTION 120**

- ☐ The claim for the benefit of any such applications are set forth in the attached
ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY
FOR DIVISIONAL, CONTINUATION OR CONTINUATION-IN-PART (C-I-P)
APPLICATION.

**ALL FOREIGN APPLICATION(S), IF ANY, FILED MORE THAN 12 MONTHS
(6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION**

NOTE: If the application filed more than 12 months from the filing date of this application is a PCT filing forming the basis for this application entering the United States as (1) the national stage, or (2) a continuation, divisional, or continuation-in-part, then also complete ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR C-I-P APPLICATION for benefit of the prior U.S. or PCT application(s) under 35 U.S.C. Section 120.

POWER OF ATTORNEY

I hereby appoint the following practitioner(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

(list name and registration number)

JOSEPH H. HANDELMAN, 26179
JOHN RICHARDS, 31053
RICHARD J. STREIT, 25765
PETER D. GALLOWAY, 27885
IAN C. BAILLIE, 24090
THOMAS F. PETERSON, 24790

RICHARD P. BERG, 28145
JULIAN H. COHEN, 20302
WILLIAM R. EVANS 25858
JANET I. CORD, 33778
CLIFFORD J. MASS, 30086
CYNTHIA R. MILLER, 34678

(Check the following item, if applicable)

- ☐ I hereby appoint the practitioner(s) associated with the Customer Number provided below to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.
- ☐ Attached, as part of this declaration and power of attorney, is the authorization of the above-named practitioner(s) to accept and follow instructions from my representative(s).

NOTE: "Special care should be taken in continuation or divisional applications to ensure that any change of correspondence address in a prior application is reflected in the continuation or divisional application. For example, where a copy of the oath or declaration from the prior application is submitted for a continuation or divisional application filed under 37 CFR 1.53(b) and the copy of the oath or declaration from the prior application designates an old correspondence address, the Office may not recognize, in the continuation or divisional application, the change of correspondence address made during the prosecution of the prior application. Applicant is required to identify the change of correspondence address in the continuation or divisional application to ensure that communications from the Office are mailed to the current correspondence address. 37 CFR 1.63(d)(4)." Section 601.03, M P E.P., 7th Ed

SEND CORRESPONDENCE TO

Ladas & Parry
26 West 61st Street
New York, N.Y. 10023

DIRECT TELEPHONE CALLS TO:
(Name and telephone number)

(complete the following if applicable)

Since this filing is a [] continuation [] divisional there is attached hereto a Change of Correspondence Address so that there will be no question as to where the PTO should direct all correspondence.

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE(S)

NOTE: Carefully indicate the family (or last) name, as it should appear on the filing receipt and all other document.

NOTE: Each inventor must be identified by full name, including the family name, and at least one given name without abbreviation together with any other given name or initial, and by his/her residence, post office address and country of citizenship. 37 C.F.R. Section 1.63(a)(3).

NOTE: Inventors may execute separate declarations/oaths provided each declaration/oath sets forth all the inventors. Section 1.63(a)(3) requires that a declaration/oath, inter alia, identify each inventor and prohibits the execution of separate declarations/oaths which each sets forth only the name of the executing inventor. 62 Fed. Reg. 53,131, 53,142, October 10, 1997,

Full name of sole or first inventor

1-00 Claus _____ Nygaard _____ RASMUSSEN _____
(Given Name) (Middle Initial or Name) Family (Or Last Name)

Inventor's signature (x) [Signature]

Date (x) MAR 06 2002 Country of Citizenship DK DKX

Residence VANLOSE, DK

Post Office Address KNIVHOLTVEJ 16, 1 tv., DK-2720 VANLOSE, DK

Full name of second joint inventor, if any

Jorgen _____ Nygaard _____ NIELSEN _____
(Given Name) (Middle Initial or Name) Family (Or Last Name)

Inventor's signature (x) _____

Date (x) _____ Country of Citizenship DK

Residence VIRUM, DK

Post Office Address LAVENDELHAVEN 75, DK-2830 VIRUM, DK

Full name of third joint inventor, if any

3-06 Jens _____ Jacob _____ OSTERGAARD _____
(Given Name) (Middle Initial or Name) Family (Or Last Name)

Inventor's signature (x) [Signature]

Date (x) FEB 17 2002 Country of Citizenship DK

Residence FREDERIKSBERG, DK DKX

Post Office Address C. T. BARFODVEJ 11, 1 tv., DK-2000 FREDERIKSBERG, DK

SIGNATURE(S)

NOTE: Carefully indicate the family (or last) name, as it should appear on the filing receipt and all other document.

NOTE: Each inventor must be identified by full name, including the family name, and at least one given name without abbreviation together with any other given name or initial, and by his/her residence, post office address and country of citizenship 37 C.F.R. Section 1.63(a)(3)

NOTE: Inventors may execute separate declarations/oaths provided each declaration/oath sets forth all the inventors. Section 1.63(a)(3) requires that a declaration/oath, inter alia, identify each inventor and prohibits the execution of separate declarations/oaths which each sets forth only the name of the executing inventor. 62 Fed. Reg. 53,131, 53,142, October 10, 1997.

Full name of sole or first inventor

Claus _____ Nygaard _____ RASMUSSEN _____
(Given Name) (Middle Initial or Name) Family (Or Last Name)

Inventor's signature (x) _____

Date (x) _____ Country of Citizenship _____ DK

Residence _____ VANLOSE, DK

Post Office Address _____ KNIVHOLTVEJ 16, 1 tv., DK-2720 VANLOSE, DK

Full name of second joint inventor, if any

Jorgen _____ Nygaard _____ NIELSEN _____
(Given Name) (Middle Initial or Name) Family (Or Last Name)

Inventor's signature (x) Jorgen Nygaard Nielsen

Date (x) 28-12-2001 Country of Citizenship _____ DK

Residence _____ VIRUM, DK DKX

Post Office Address _____ LAVENDELHAVEN 75, DK-2830 VIRUM, DK

Full name of third joint inventor, if any

Jens _____ Jacob _____ OSTERGAARD _____
(Given Name) (Middle Initial or Name) Family (Or Last Name)

Inventor's signature (x) _____

Date (x) _____ Country of Citizenship _____ DK

Residence _____ FREDERIKSBERG, DK

Post Office Address _____ C. T. BARFODVEJ 11, 1 tv., DK-2000 FREDERIKSBERG, DK

(check proper box(es) for any of the following added page(s)
that form a part of this declaration)

[] **Signature** for fourth and subsequent joint inventors. *Number of pages added* _____

* * *

[] **Signature** by administrator(trix), executor(trix) or legal representative for deceased or incapacitated inventor. *Number of pages added* _____

* * *

[] **Signature** for inventor who refuses to sign or cannot be reached by person authorized under 37 C.F.R. Section 1.47. *Number of pages added* _____

* * *

[] Added page for **signature** by one joint inventor on behalf of deceased inventor(s) where legal representative cannot be appointed in time. (37 C.F.R. Section 1.47)

* * *

[] Added pages to combined declaration and power of attorney for divisional, continuation, or continuation-in-part (C-I-P) application.

[] Number of pages added _____

* * *

[] Authorization of practitioner(s) to accept and follow instructions from representative.

(If no further pages form a part of this Declaration,
then end this Declaration with this page and check the following item)

[X] This declaration ends with this page.

Practitioner's Docket No. U013710-8

CHAPTER II

IN THE UNITED STATES ELECTED OFFICE (EO/US)

PCT/DK00/00227 4 MAY 2000 17 MAY 1999
INTERNATIONAL APPLICATION NO. INTERNATIONAL FILING DATE PRIORITY DATE CLAIMED

A METHOD FOR OVERCURRENT PROTECTION IN A SUPERCONDUCTING CABLE

TITLE OF INVENTION

1. CLAUD NYGAARD RASMUSSEN
2. JORGEN NYGARD NIELSEN
3. JENS JACOB OSTERGAARD

APPLICANT(S)

Box PCT

Assistant Commissioner for Patents

Washington, D.C. 20231

ATTENTION: EO/US

COMPLETION OF FILING REQUIREMENTS
FOR INTERNATIONAL APPLICATION ENTERING U.S. NATIONAL STAGE
IN U.S. ELECTED OFFICE (EO/US) UNDER 35 U.S.C. § 371

(check and complete the applicable item, if applicable)

- ☒ This replies to the Notice of Missing Requirements under 35 U.S.C. § 371 and 37 C.F.R. § 1.495 (FORM PCT/DO/EO/905).
- ☒ A copy of FORM PCT/DO/EO/905 accompanies this response.

WARNING:

Where the items being submitted to complete the entry of the international application into the national phase are subsequent to 30 months from the priority date the application is still considered to be in the international state and if mailing procedures are utilized to obtain a date the express mail procedure of 37 C.F.R. § 1.10 must be used (because international application papers are not covered by an ordinary certificate of mailing. 37 C.F.R. § 108(2)(xi).

CERTIFICATION UNDER 37 C.F.R. 1.10*

(Express Mail label number is mandatory.)

(Express Mail certification is optional.)

I hereby certify that this Completion of Filing Requirements and the papers indicated as being transmitted therewith are being deposited with the United States Postal Service on this date March 20, 2002, in an envelope as "Express Mail Post Office to Addressee," Mailing Label Number EV011021148US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

GERALDINE MARTI

(type or print name of person mailing paper)

Geraldine Marti

Signature of person mailing paper

WARNING:

Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

***WARNING:**

Each paper or fee filed by "Express Mail" must have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. 1.10(b).
"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will not be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

(Completion of Filing Requirements for International Application Entering U.S. Elected Office (EO/US)

NOTE: Documents and fees must be clearly identified as a submission to enter the national stage under 35 U.S.C. § 371. Otherwise, the submission will be considered as being made under 35 U.S.C. § 111. 37 C.F.R. § 1.495(g).

DECLARATION OR OATH

- I. (a) ☒ No original declaration or oath was filed. Enclosed is the original declaration or oath for this application.

OR

- (b) ☐ The declaration or oath that was filed was determined to be defective. A new original oath or declaration is attached.

NOTE: For surcharge fee for filing declaration after filing date complete item IV(3)

NOTE: NOTE: Acceptable minimums in the declaration in an ordinarily filed U.S. application for identification of the specification to which it applies are:

- (A) application number (consisting of the series code and the serial number, e.g., 08/123,456);
- (B) serial number and filing date;
- (C) attorney docket number which was on the specification as filed;
- (D) title which was on the specification as filed and reference to an attached specification which is both attached to the oath or declaration at the time of execution and submitted with the oath or declaration; or
- (E) title which was on the specification as filed and accompanied by a cover letter accurately identifying the application for which it was intended by either the application number (consisting of the series code and the serial number, e.g., 08/123,456), or serial number and filing date. Absent any statement(s) to the contrary, it will be presumed that the application filed in the PTO is the application which the inventor(s) executed by signing the oath or declaration. M.P.E.P. Section 601.01(a), 7th ed. Notice of September 12, 1983 (1035 O.G. 3). See MPEP § 601.01(a), 7th ed.

NOTE: Another minimum found acceptable in the declaration is the filing date (i.e., date of express mail) and the express mail number, useful where the serial number is not yet known. But note the practice where the express mail deposit is a Saturday, Sunday or holiday within the District of Columbia. 37 C.F.R. § 1.10(c).

NOTE: See 37 C.F.R. § 1.41(a).

(complete as applicable)

Attached is a

- (c) ☐ Statement by a registered attorney that the application filed in the PTO is the application that the inventor executed by signing the declaration.
- (d) ☐ Statement that the "attached" specification is a copy of the specification and any amendments thereto that were filed in the PTO to obtain the filing date.
- (e) ☐ Statement that substitute specification contains no new matter.
- (f) ☐ Preliminary Amendment
- (g) ☐ Transmittal of Formal Drawing(s) Prior to Notice of Allowance
- (h) ☐ Submission of "Sequence Listing," computer readable copy, and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence

AMENDMENT

II.

(complete as applicable)

- ☐ An amendment in accordance with 37 C.F.R. § 1.121 is attached.
☐ The attached amendment cancels claims _____ inclusive.

TRANSMITTAL OF ENGLISH TRANSLATION OF NON-ENGLISH LANGUAGE PAPERS

- III. ☐ Submitted herewith is an English translation of the non-English language international application papers as originally filed. It is requested that this translation be used as the copy for examination purposes in the PTO. (See 37 C.F.R. 1.495(c))

NOTE: For fee for processing a non-English application, complete item IV(4).

NOTE: A non-English oath or declaration in the form provided or approved by the PTO need not be translated. 37 C.F.R. § 1.69(b).

FEES

IV.

NOTE: See 37 C.F.R. § 1.28(a).

1. Fees for claims

- ☐ each independent claim in excess of 3
(37 C.F.R. § 1.492(b))—\$84.00; small entity—\$42.00 \$ _____
- ☐ each claim in excess of 20
(37 C.F.R. § 1.492(c))—\$18.00; small entity—\$9.00 \$ _____
- ☐ multiple dependent claims(s)
(37 C.F.R. § 1.492(d))—\$280.00; small entity—\$140.00 \$ _____

2. Surcharge fees

- ☒ surcharge set forth in 37 C.F.R. § 1.492(e) for accepting the declaration later than 30 months after the priority date in filing an application in the U.S. as a designated office—\$130.00; small entity—\$65.00 \$ 130.00

NOTE: The processing fee in the next item 3 below is not subject to a reduction for small entity status.

3. ☐ processing fee set forth in 37 C.F.R. § 1.492(f) for acceptance of an English translation later than 30 months after the priority date—\$130.00 \$ _____

03/25/2002 MNGUYEN 00000075 10009227

01 FC:154

130.00 0P

Total Fees \$ 130.00

SMALL ENTITY STATUS

- V. a. ☐ A statement that this filing is by a small entity

NOTE: See 37 C.F.R. § 1.28(a).

(check and complete applicable items)

- ☐ is attached.
☐ was filed on _____.
☐ was made by paying the basic national fee as a small entity.
☐ is being made now by paying the basic national fee as a small entity.

- b. ☐ A separate refund request accompanies this paper.

EXTENSION OF TIME

(complete (a) or (b), as applicable)

VI.

The proceedings herein are for a patent application. Accordingly, the provisions of 37 C.F.R. § 1.136(a) apply.

- (a) ☐ Applicant petitions for an extension of time, the fees for which are set out in 37 C.F.R. § 1.17(a)(1)-(4), for the total number of months checked out below:

| | Extension (<u>months</u>) | Fee for other than <u>small entity</u> | Fee for <u>small entity</u> |
|--------------------------|--------------------------------|---|--------------------------------|
| <input type="checkbox"/> | one month | \$ 110.00 | \$ 55.00 |
| <input type="checkbox"/> | two months | \$ 400.00 | \$ 200.00 |
| <input type="checkbox"/> | three months | \$ 920.00 | \$ 460.00 |
| <input type="checkbox"/> | four months | \$ 1,440.00 | \$ 720.00 |
| <input type="checkbox"/> | five months | \$ 1,960.00 | \$ 980.00 |
| | | Fee: | \$ _____ |

If an additional extension of time is required, please consider this a petition therefor.

(check and complete the next item, if applicable)

- ☐ An extension for _____ months has already been secured. The fee paid therefor of \$ _____ is deducted from the total fee due for the total months of extension now requested.

Extension fee due with this request \$ _____

or

- (b) ☒ Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

TOTAL FEE DUE

VII.

The total fee due is:

Completion fee(s) \$ 130.00
Extension fee (if any) \$ _____
TOTAL FEE DUE \$ 130.00

PAYMENT OF FEES

VIII.

- ☒ Enclosed is a check in the amount of \$ 130.00
☐ Charge Account No. _____ in the amount of \$ _____
☐ A duplicate of this request is attached.

NOTE: Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37 C.F.R. § 1.22(b).

AUTHORIZATION TO CHARGE ADDITIONAL FEES

IX.

WARNING: Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges if extra claims are authorized.

NOTE: "A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).

NOTE: "Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

- ☒ The Commissioner is hereby authorized to charge the following additional fees that may be required by this paper and during the entire pendency of this application to Account No. 12-0425

☒ 37 C.F.R. § 1.492(a)(1), 1.492(a)(4) (filing fees)

☐ 37 C.F.R. § 1.492(b), (c), and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

- [X] 37 C.F.R. § 1.17 (application processing fees)
- [X] 37 C.F.R. § 1.17(a)(1)-(5)(extension fees pursuant to § 1.136(a)).
- [X] 37 C.F.R. § 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. § 1.311(b)).

NOTE: *Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b).*

NOTE: *37 C.F.R. § 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying . . . issue fee." From the wording of 37 C.F.R. § 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.*


- [] 37 C.F.R. § 1.492(e) and/or (f) surcharge fees for filing the declaration and/or an English translation of an international application later than 30 months from the earliest-claimed priority date.

WARNING: *It would be wise to always check this last authorization.*

Reg. No.: 25,858

Tel. No.: (212) 708-1930

Customer No.: 00140


SIGNATURE OF PRACTITIONER

WILLIAM R. EVANS

(type or print name of practitioner)

P.O. Address

c/o Ladas & Parry
26 West 61st Street
New York, N.Y. 10023